

chemists have held and have at different times put into their treatises. Time and reflection, to an extent that can hardly be spared by most people, would be required to come to a definite judgment as to how far the notions put forward are allowable or should be at once put aside, whether the "resemblance to the ways of nature" on which the writer insists involves any germ of general ideas beyond those already recognised. But in any case there can be no question as to the acuteness of the writer; and the Royal Society of Edinburgh has been well advised in making his ideas accessible to others who are attracted by the same range of theoretical speculation, in subjects which are only now coming to the threshold of the dynamical stage.

J. L.

### UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

CAMBRIDGE.—The subject of the Rede lecture, to be given by Prof. Osborne Reynolds, F.R.S., on June 10, at 11.30 a.m., is "On an Inversion of Ideas as to the Structure of the Universe."

Prof. Forsyth, F.R.S., will represent the University at the celebration of Abel's centenary, to be held at Christiania in September, 1902.

The museums syndicate propose to assign the greater portion of the buildings about to be vacated by the botanical department to the engineering laboratory. The number of the students engaged in the latter is now more than 200, and extension of the accommodation now provided is urgently necessary. The syndicate regret that they are unable to make arrangements for additional accommodation for the departments of human anatomy and physiology, or for the museum of zoology, which are also in need of considerable expansion.

The Graces authorising the recently proposed changes in the natural sciences tripos will be voted on in the senate on May 22. It is understood that some of them will be opposed.

Mr. W. Bateson, F.R.S., is again to be deputed to lecture in zoology for Prof. Newton during the ensuing academical year.

The Frank Smart studentship in botany will be vacant at midsummer. The studentship is of the annual value of 100*l.* and is intended to further the scientific study of botany by supplying students with some means of pursuing original investigations in this subject after they have taken the degree of Bachelor of Arts. It is open to all students of the University who have taken honours in the first part of the natural sciences tripos, provided that not more than fourteen terms have elapsed since their first term of residence. The studentship is not awarded by a competitive examination. Candidates should send in their names to the master of Gonville and Caius College on or before June 10, with a statement of their University standing.

THE second reading of the Education Bill was passed by the House of Commons on Thursday, May 8, after a debate which extended over three days. The majority in favour of the second reading was 237, the numbers being 402 votes for the Bill and 165 against.

To assist the scholarship scheme founded by the late Mr. Rhodes, Sir Alfred Jones, head of the shipping firm of Elder, Dempster and Co., announces that he will agree to give a free passage backwards and forwards from any colonial port served by his firm's steamers to both Jamaican and Canadian scholars once a year during the tenure of their scholarships. He adds:—"I trust that my example will be followed by shipowners trading to other colonies, and I hope that it may thereby be made universal, so as to put all the Rhodes scholarships from the colonies on an equal footing."

THE announcement is made that Prof. Karl B. Lehmann, of Würzburg, has been appointed to the chair of hygiene at the University of Munich, which recently became vacant by the death of Prof. Hans Buchner on March 30. He was formerly connected with the University, having been trained there as a medical student, and subsequently acted as assistant to Prof. Pettenkofer and as privat-docent for many years. Prof. Lehmann, who is a Swiss by birth, is still in the prime of life, but has already made a high reputation as a hygienist. His first special scientific work was the study of the physiology of the

sense-organs, his contributions to this department of science being of great and practical value. He has also studied and written upon the action and influence of various gases upon the animal organism, and more recently has given much attention to the study of physiological chemistry in connection with general metabolic processes.

IN connection with the subject of State aid for secondary education, it is of interest to read in *Science* that the General Assembly of the State of Iowa has passed a mill tax for the building support of the three educational institutions of Iowa, as follows:—State University at Iowa City, one-fifth of a mill to run for five years. This will realise 550,000 dollars. The Iowa State College of Agriculture and Mechanic Arts at Ames, one-fifth of a mill for a similar period, which will realise 550,000 dollars. The State Normal School at Cedar Falls, one-tenth of a mill for five years, which will realise 225,000 dollars. The State educational institutions receive in addition 434,269 dollars for the biennial period, distributed as follows:—State University, 215,000 dollars; Iowa State College of Agriculture and Mechanic Arts, 135,000 dollars—of this 35,000 dollars are for additional general support annually, and 10,000 dollars annually for the experiment station, 5,000 dollars for live stock, 5,000 dollars to begin the building of a barn, and 35,000 dollars to start a main central building; the Iowa State Normal School, 84,269 dollars.

THE general scope of the new matriculation examination for all students of the University of London are published in the official gazette. The full text of the regulations will be published at the beginning of June, and the first examination under them will commence on September 15 next. An examination under the old regulations will be held in January, 1903, and under both sets of regulations in June, 1903. Matriculation candidates will be expected to show a competent knowledge in each of the following subjects, according to the details specified under the several heads:—(1) English, one paper of three hours. (2) Elementary mathematics, two papers of three hours each. (3) Latin, or elementary mechanics, or elementary physics (heat, light and sound), or elementary chemistry, or elementary botany, one paper of three hours in each subject. (4) Two of the following subjects, neither of which has already been taken under (3). One paper of three hours in each subject. If Latin be not taken, one of the other subjects selected must be another language from the list, either ancient or modern:—Latin, Greek, French, German, Arabic, Sanskrit, Spanish, Portuguese, Italian, Hebrew, history (ancient or modern), logic, physical and general geography, geometrical and mechanical drawing, mathematics (more advanced), elementary mechanics, elementary chemistry, elementary physics—(a) heat, light and sound, or (b) electricity and magnetism; elementary biology—(a) botany, or (b) zoology.

DR. D. C. GILMAN contributes to the May number of *Scribner's Magazine* some further reminiscences of noteworthy scholars with whom he has been brought in contact as president of the Johns Hopkins University. An English mathematician remarked to him one day that he had heard of Baltimore as a place which exported corn and imported mathematics, and this epigram was founded upon fact. Cayley and Sylvester both went to the new University from England. Cayley spent a winter at Baltimore, and profoundly impressed his hearers; Sylvester spent the seven years there which preceded his seventieth birthday, and left to become Savilian professor at Oxford. Many stories are told of Sylvester's eccentricities, but most of them are apocryphal. He became possessed of a sort of monomania for rhyme, and one of his most extraordinary compositions was a long series of lines, every one of which ended with a syllable that he pronounced as *ind*. This *tour de force* reached four or five hundred verses. Sometimes he was very absent-minded. For example, he arrived from Philadelphia in a late train one night and walked bareheaded to his hotel. The next morning he demanded his hat, and insisted that it was in the house, and he would not be persuaded that it had not been stolen until a telegram revealed the fact that the hat had been found in the train at Washington. In 1884, Lord Kelvin gave a course of lectures at the University. "The lectures," says Dr. Gilman, "went on from day to day upon the topics that occurred to the lecturer, or that were suggested by the questions of his hearers. Everyone who was capable of following him was enchanted, 'How long will these lectures continue?' asked one of the audience. 'I do not know,' replied Lord Rayleigh, who was one of the

followers, 'I suppose they will end some time, but I confess I see no reason why they should.' Dr. Gilman concludes his article with the following wise words:—"In the conduct of a university, secure the ablest men as professors, regardless of all other qualifications excepting those of personal merit and adaptation to the chairs that are to be filled. Borrow if you cannot enlist. Give them freedom, give them auxiliaries, give them liberal support. Encourage them to come before the world of science and of letters with their publications. Bright students, soon to be men of distinction, will be their loyal followers, and the world will sing a loud Amen."

### SCIENTIFIC SERIAL.

*Memoirs of the Kazan Society of Naturalists*, vol. xxxv.—Researches into the Protozoa of the Black Sea, by R. Minkiewicz. The organisation, the multiplication and the systematical position of Euplotes (Ehrbg.) are discussed.—Materials for the knowledge of the soil and vegetation of western Siberia, by A. Gordyagin. This is the second and last part of a very valuable work which was begun in a previous issue of the same periodical (vol. xxxiv.). The fir, Scotch fir and birch forests, the mutual relations between the chief arborescent species, and the Steppe vegetation are discussed in this part, which contains also a large-scale botanical map of the western portion of the basin of the Irtysh and a full index.—The physicochemical structure of the chlorophyll grain, by M. S. Tsvet. Experimental researches and critical review of the work hitherto done.—Botanic-geographical researches in the province of Saratov, by B. Keller. An interesting general review of the vegetation (summary in German) and a list of 987 plants belonging to the flora of Saratov are given.—On the soils of south-eastern Russia, by A. Ostrikoff, being descriptions and chemical analyses of salt-bearing soils of southern Samara.

### SOCIETIES AND ACADEMIES.

#### LONDON.

**Physical Society**, May 9.—Prof. S. P. Thompson, president, in the chair.—Dr. P. E. Shaw exhibited a simple electric micrometer. Two years ago, Dr. Shaw described an instrument with which he measured very small lengths by the application of electric contacts, and the micrometer shown was a simple form of the original apparatus. A screw, fitted with a milled head, turns in a fixed nut, and its lower end presses upon the extremity of the long arm of a lever. A metal point is attached to the short arm, and the distance through which it moves, on turning the milled head, can be deduced from a knowledge of the pitch of the screw and the ratio between the arms of the lever. In using the instrument, this point is always brought up to a metal surface, and the contact is accurately determined by the telephonic arrangement described in connection with the original micrometer. Dr. Shaw illustrated the use of the instrument for measuring small lengths by describing the following eight applications to ordinary laboratory measurements:—(1) The measurement of the thickness of plates, films or fibres. The object is placed between two metal plates. The point or the micrometer is adjusted to touch the top plate and the reading taken. The object is removed, the point is again brought into contact with the top plate, and the difference between the readings in the two cases gives the thickness of the film. (2) The determination of Young's modulus by the elongation of a wire. Dr. Shaw described experiments on two wires, each  $2\frac{1}{2}$  metres long, hanging side by side, one of copper and the other of steel. The wires terminated in horizontal platforms to which the stretching weights were attached. The base of the instrument rested on one platform, while depressions of the other, due to loading, were measured. In this way any error, on account of the bending of the beam from which the wires were hung, was eliminated. (3) The determination of Young's modulus by the bending of a beam. (4) The determination of simple rigidity by a static method. Observations were made upon a rod held horizontally by rigid wall brackets. One end of the rod was fixed and the other held in position by a pin pressed into a hole in the end of the rod. From this end an arm projected outwards. Weights were applied to the extremity of this arm, and the twist

measured by observing with the micrometer the movement of the end of the arm. (5) Application to the extensometer. (6) Measurement of thermal expansion. (7) Microscopic measurements. In measuring the diameter of a capillary tube, the cross wire of the microscope is made to touch one side of the tube, and the point of the micrometer is brought into contact with the metal stage. The stage is then moved by a screw until the cross wire comes to the other side of the tube. The micrometer point is moved into contact again, and the difference in the readings gives the diameter of the tube. In this measurement the full magnifying power of the microscope is utilised, and the work of moving the stage is performed by a rough screw. (8) The direct measurement of the wave-length of light. Newton's rings are formed by a convex lens and a piece of plate glass. The convex lens is fixed to the short arm of the lever, and the distance through which it must be moved to cause a certain number of bands to appear at the centre gives a means of calculating the wave-length of the light employed.—Papers on the conservation of entropy, by Mr. J. A. Erskine, and rational units of electromagnetism, by Sig. G. Giorgi, were postponed.

**Chemical Society**, April 30.—Prof. Emerson Reynolds, V.P.R.S., in the chair.—The preparation of absolute alcohol from strong spirit, by Dr. Young, F.R.S. The 4 or 5 per cent. of water remaining in the strongest rectified spirit procurable by distillation can be removed by adding to it a volatile liquid capable of forming with alcohol and water a ternary mixture boiling below  $78^{\circ}3$  C. and distilling. Benzene is a suitable substance for this purpose, the ternary mixture so formed boiling at  $64^{\circ}85$ . The alcohol thus obtained contains a trace of benzene, which in turn can be removed by a redistillation with pure hexane.—On the properties of mixtures of the lower alcohols with water, by Dr. Young, F.R.S., and Miss E. C. Fortey. Methyl alcohol can be prepared in an absolute condition by simple distillation through an efficient still-head. The higher homologues, such as isopropyl, propyl and tertiary butyl alcohols, can be dehydrated by addition of benzene and redistillation. The constant boiling mixtures of these alcohols with water are not definite hydrates.—On the properties of mixtures of the lower alcohols with benzene and with benzene and water, by Dr. Young, F.R.S., and Miss E. C. Fortey. Among the lower alcohols of the paraffinic series, all except isoamyl alcohol form constant boiling mixtures with benzene, but beyond the amyl alcohols this phenomenon no longer occurs; ethyl, propyl, isopropyl and tertiary butyl alcohols alone form constant boiling ternary compounds with benzene and water.—Fractional distillation as a method of quantitative analysis, by Dr. Young, F.R.S., and Miss E. C. Fortey. When a mixture which tends to separate into two components is distilled, the portion of the distillate obtained below the temperature midway between the boiling points of the two constituents is almost exactly equal to the weight of the more volatile component of the mixture. This principle can also be extended to ternary mixtures.—On the vapour pressures and boiling points of mixed liquids, by Dr. Young, F.R.S. Mixtures of bromo- and chloro-benzene exhibit a close agreement with van der Waals's law, which states that "the relation between vapour pressure and molecular composition of mixtures of liquids having equal critical points and in which  $a_{1,2} = \sqrt{a_1 a_2}$  (where  $a_{1,2}$  represents attraction of unlike molecules and  $a_1$  and  $a_2$  the attractions of like molecules) is represented by a straight line."—The correction of the boiling points of liquids from observed to normal pressure, by Dr. Young, F.R.S. An extension and improvement of Craft's table of constants of correction.—Vapour pressures and specific volumes of isopropyl isobutyrate, by Dr. Young, F.R.S., and Miss E. C. Fortey. These constants have been determined on a pure specimen of this ester prepared by electrolysis of potassium isobutyrate.—The preparation of highly substituted nitroaminobenzenes, by Dr. Orton. The author has devised a method of preparing aromatic nitroamines by the action of nitric acid on amines dissolved in acetic anhydride, and has by this method isolated and characterised a number of these substances.—The atomic weight of tellurium, by Dr. Scott, F.R.S. When tellurium is treated with methyl iodide, it forms a trimethyl tellurium iodide which crystallises well and affords a convenient method of comparing the combining weight of tellurium with that of iodine which is accurately known from Stas's determination. The ratio thus found indicates that the atomic weight of tellurium is about 127.75.—Nitrogen bromides containing the propionyl group, by Dr. Chattaway. A